

Lights Reveal the Global Dark Fleet

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Global Fishing Watch

NOAA VIIRS virtual user's workshop, June 29-30, 2022
Celebrating 10 years of SNPP





Global Fishing Watch Research Program



*+30 peer-reviewed papers
published since 2016
+2000 citations*



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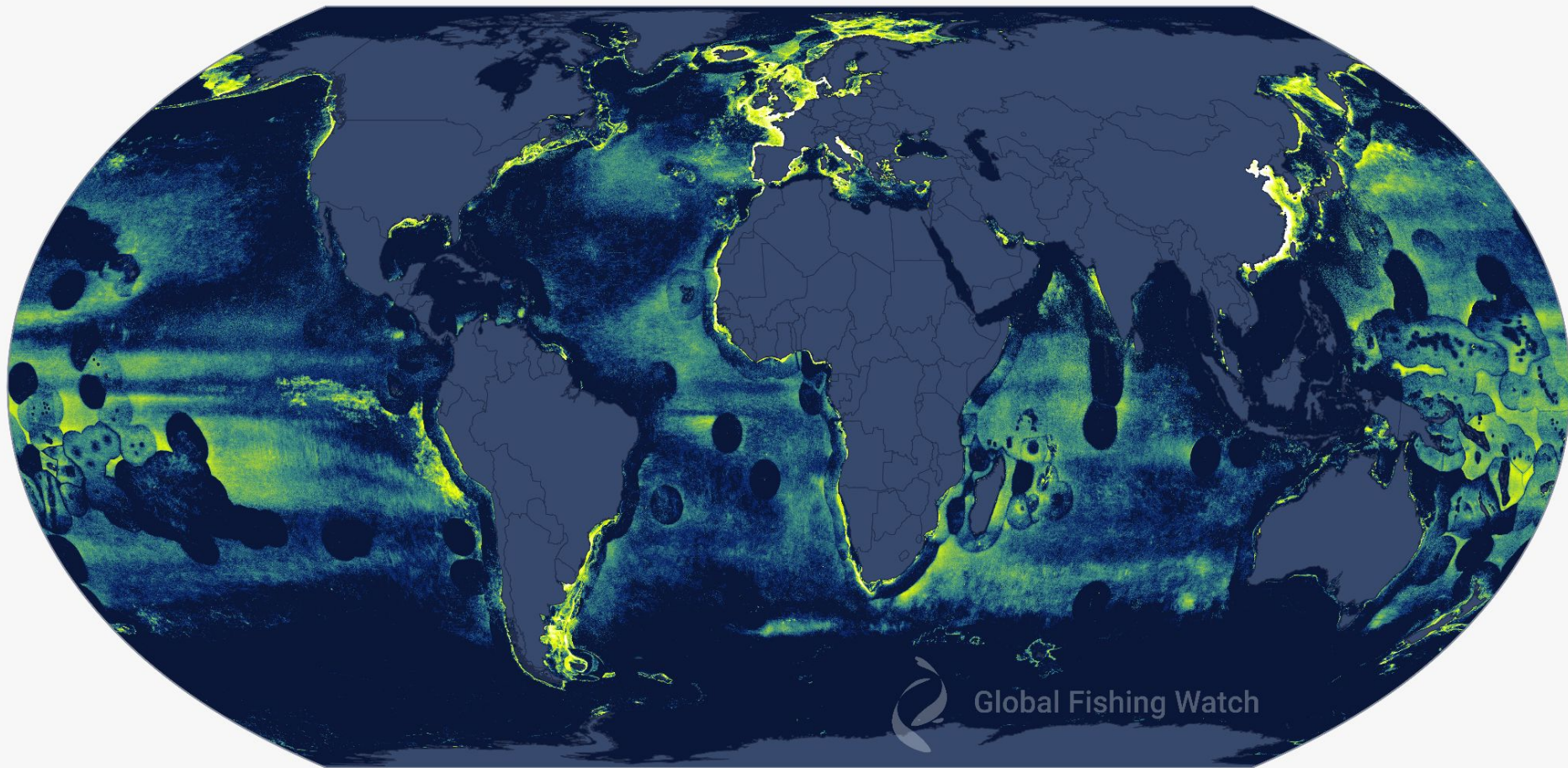


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Fishing by vessels with AIS, 2012-2020



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hours of fishing per km²





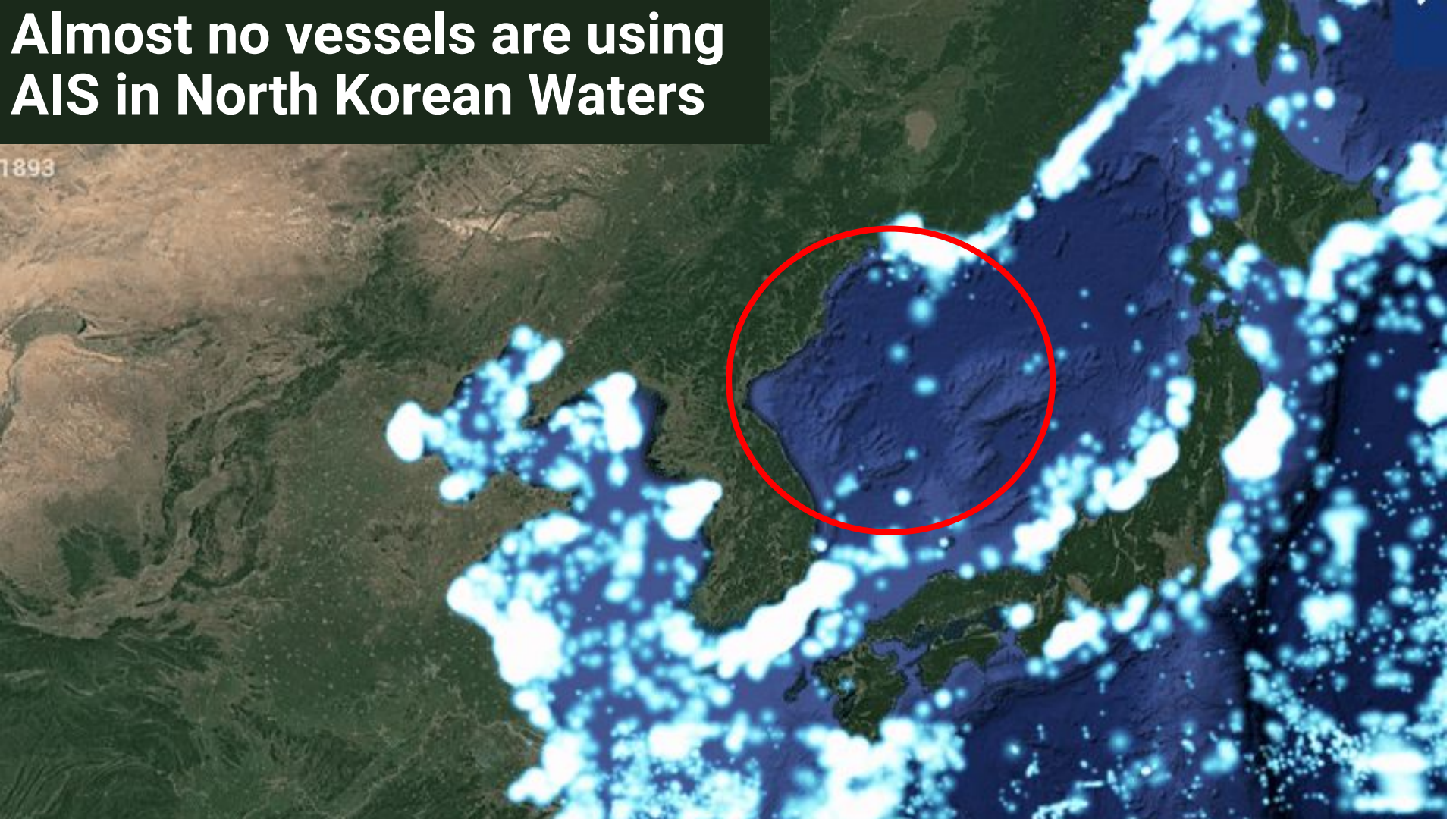
VIIRS BOAT DETECTION (VBD)

We have used the VBD product to:

- Reveal the largest known case of illegal fishing
- Match to AIS for our global interactive map
- Identify fishing grounds

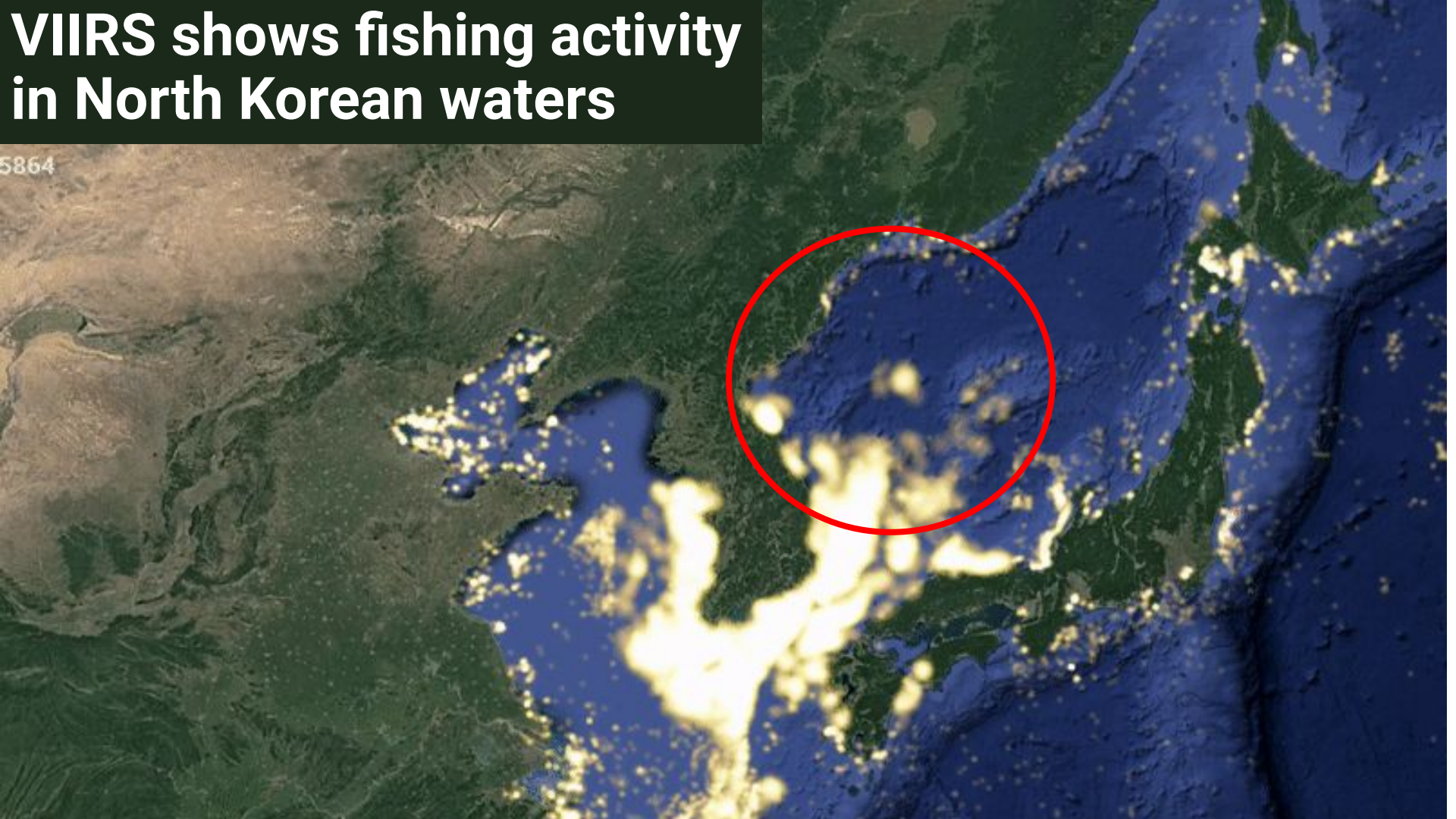
Almost no vessels are using AIS in North Korean Waters

1893



VIIRS shows fishing activity in North Korean waters

5864

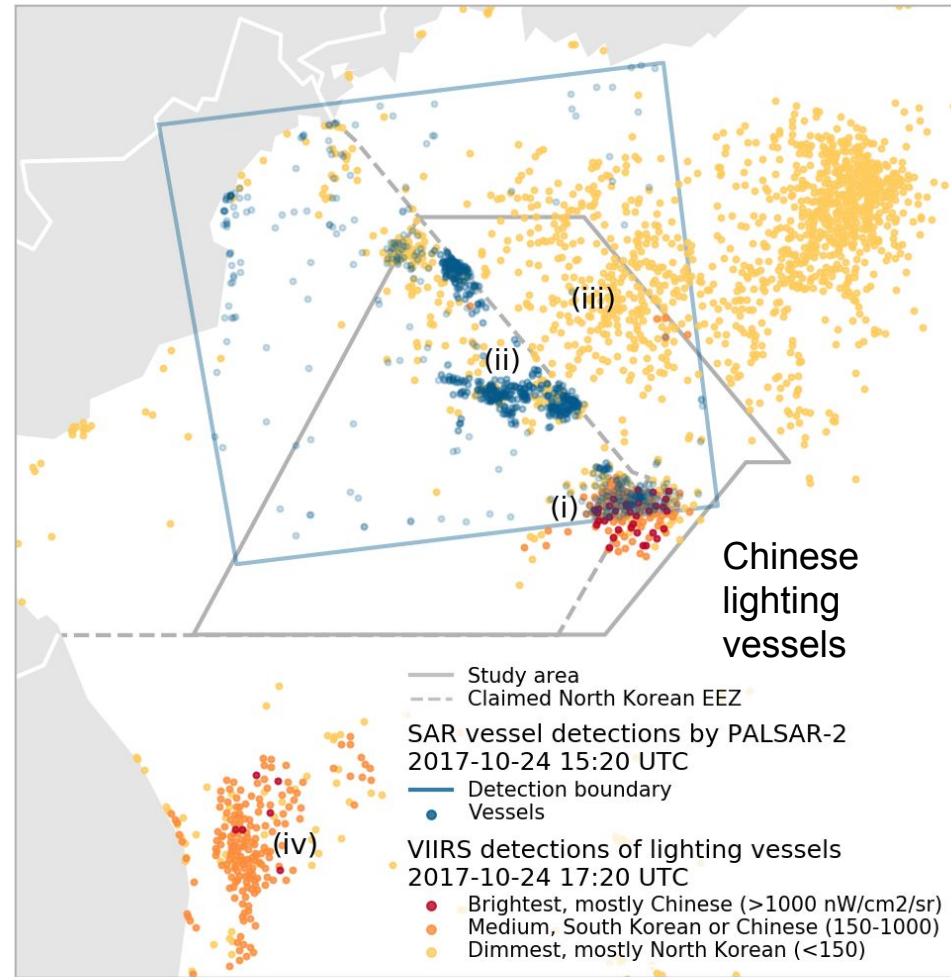


SAR (radar)

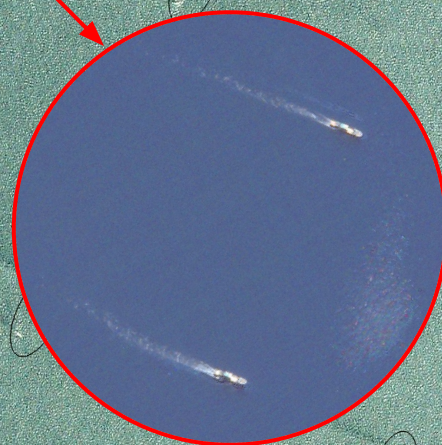
Radar detections in blue, revealing large, metal boats.

VIIRS (night lights)

Reveal dim North Korean vessels (yellow), and bright Chinese (red)

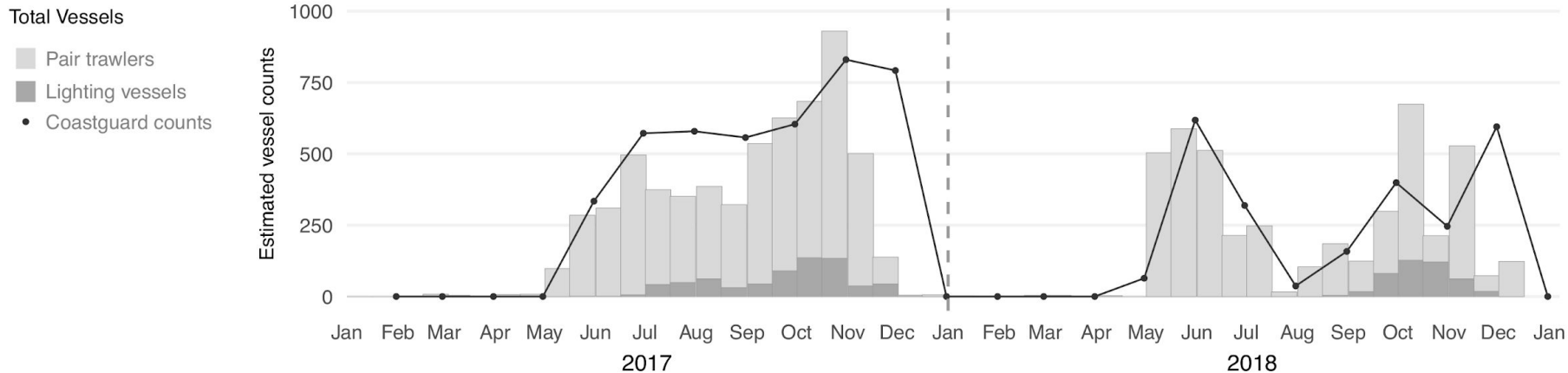


413170917 (-8min)
413170919 (-11min)

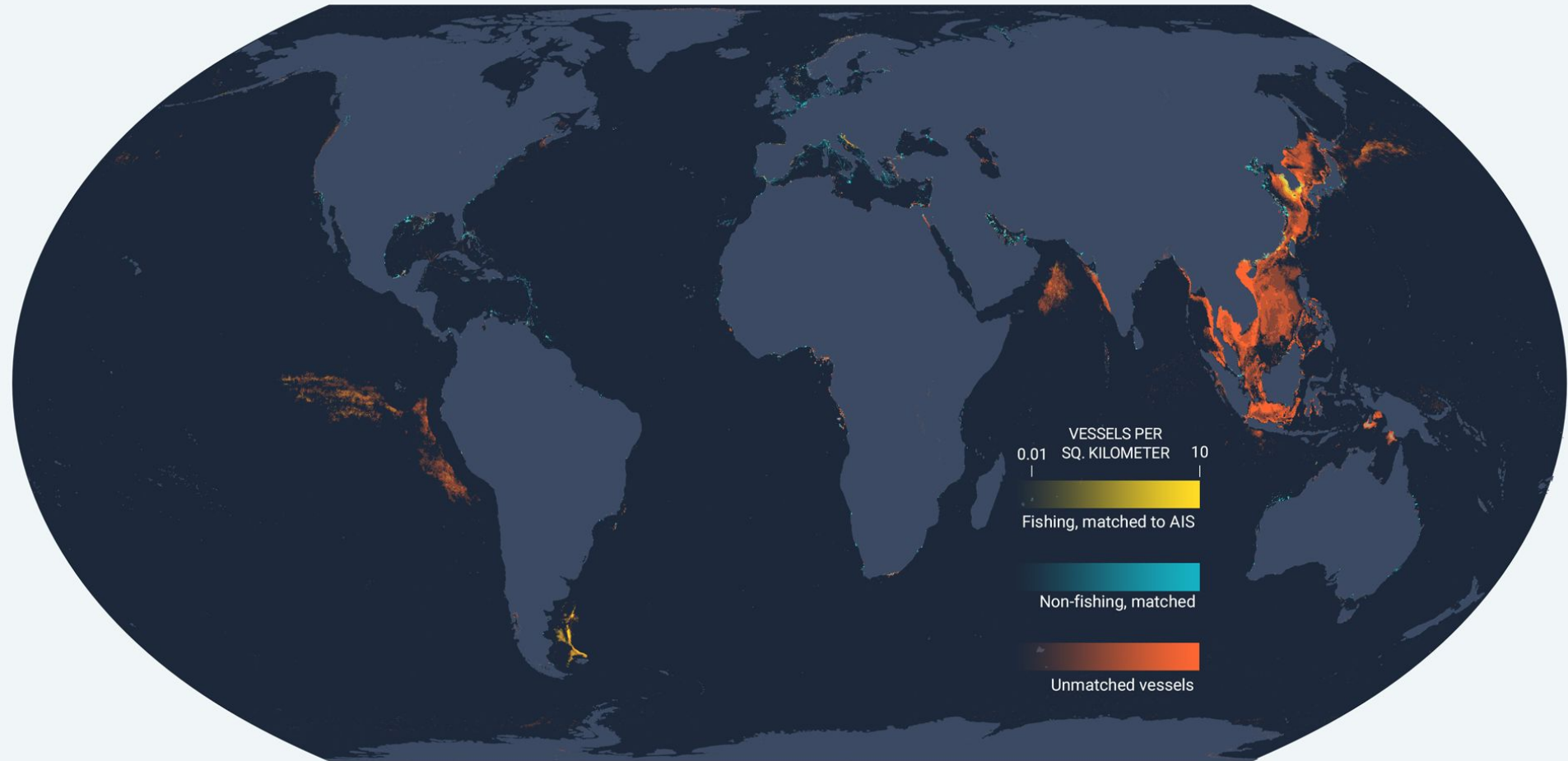


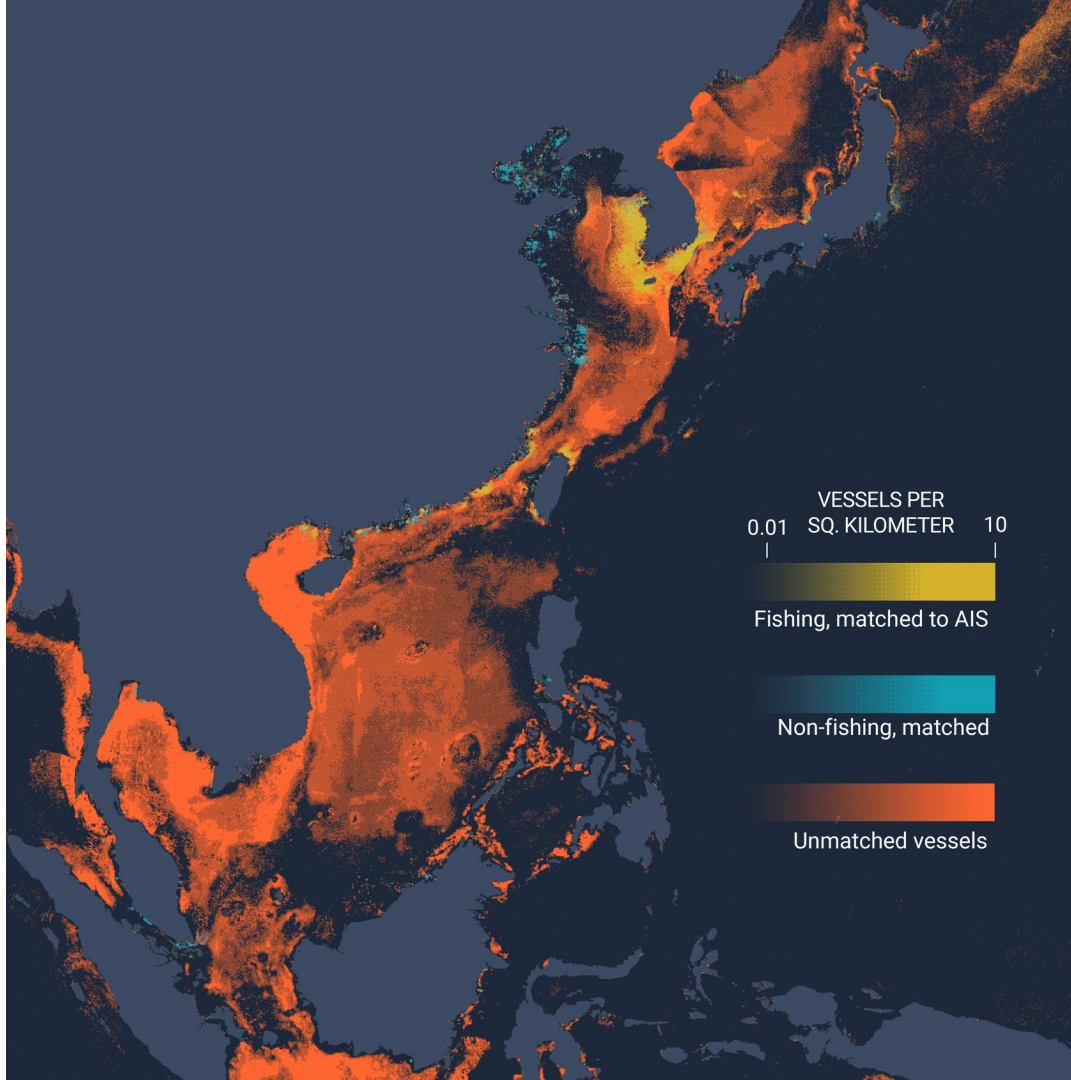
Combining these technologies reveals dark fleet activity in detail

- > 900 unique Chinese vessels violating UN sanctions
- Likely caught > 220,000 tonnes of squid
- Catch valued at >\$600M USD



Match VBD to AIS Globally





Massive untracked fleets in East and Southeast Asia

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ACTIVITY

- Apparent fishing effort
- Apparent fishing effort
- Vessel presence

DETECTIONS

Night light detections (VII) *i*

RADIANCE MATCHING

10 - 10k True

detections

0 1K 5K 10K ≥20K

Night light detections (VII) *i*

RADIANCE MATCHING

10 - 10k False

detections

0 1K 5K 10K ≥20K

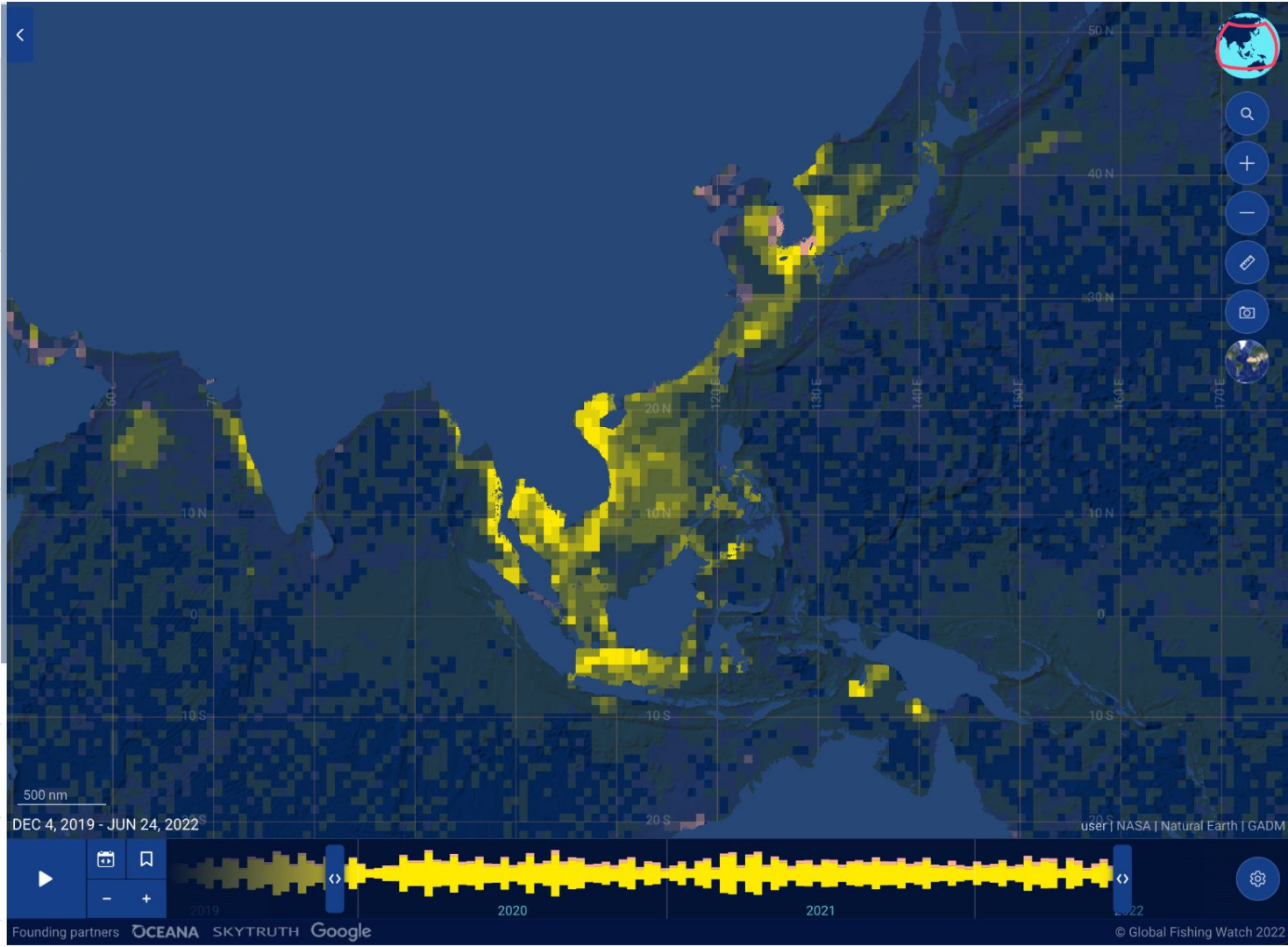
Radar detections (SAR)

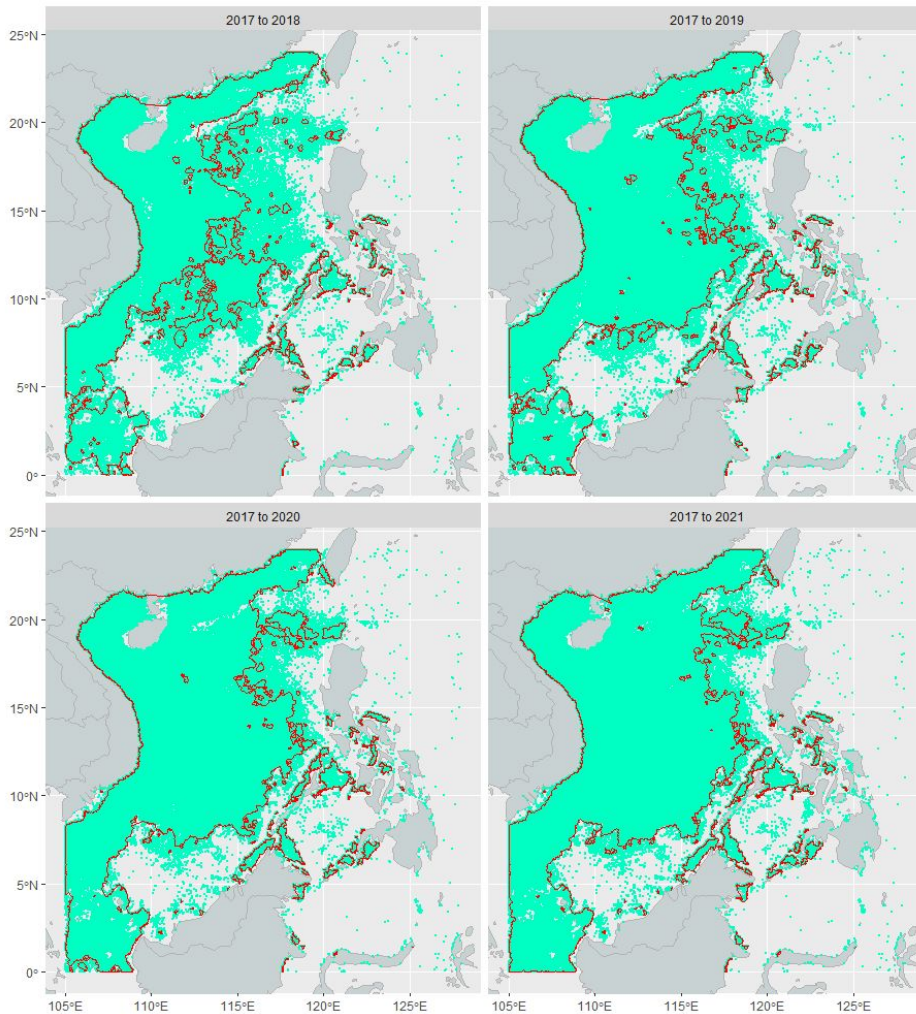
VESSELS

Search for vessels or add them from the map.

EVENTS

- Encounter Events for Carriers-Fis





VBD clusters for **cumulative years** from 2017 to 2021 showing expansion of fishing areas and persistent fishing grounds.

Green dots are individual VIIRS boat detections.

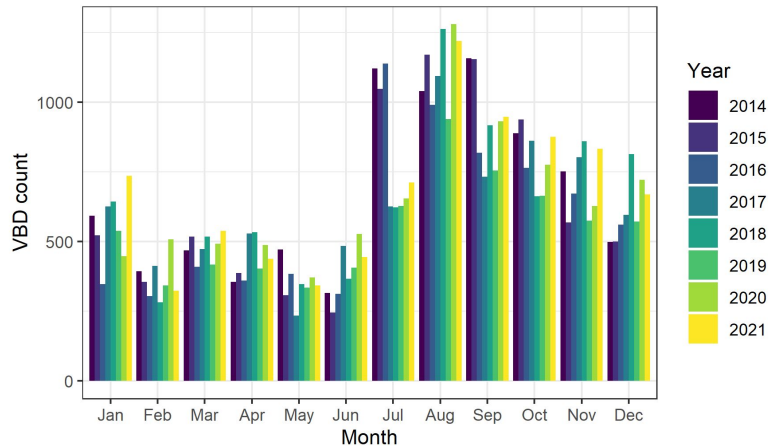
Red polygons are delineated clusters based on density of detections (i.e., at least 20 detections per cluster with each detection within 10km from another).

Note: uses only VBD with radiance > 30

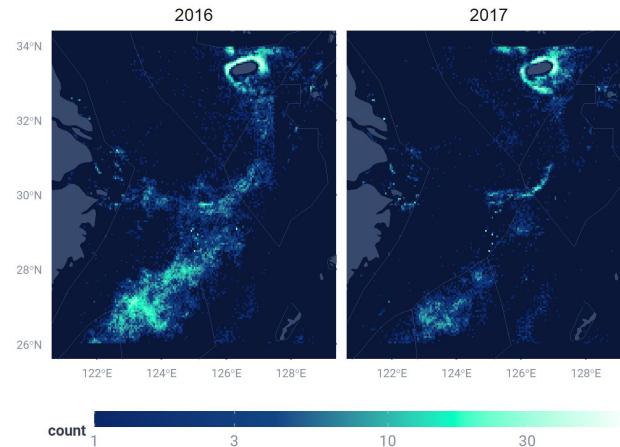
The fishing moratorium in ECS

We've developed a machine learning based VBD algorithm under collaboration with FRA in Japan. The fishing moratorium was introduced by the Chinese government recently and we are analyzing the impact through VIIRS data.

Maximum daily VBD count for each month and year
Radiance > 10 nW/cm/sr



Total VBD counts in July
Rad > 10 nW/sr/cm



What's Next?



What we would like to see...

- Develop VBD for other VIIRS sensor
- Reduce noise & improve South Atlantic Anomaly
- Process more historic data
- More satellites!

Thank you!

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